

We claim:

1. A bi-directional capillary electrophoresis device, comprising:

a middle column;

the middle column intersecting a first uncharged channel and a second uncharged channel
5 at an intersection point wherein the middle column is approximately perpendicular to the
first uncharged channel and the second uncharged channel; and

a negative electrode in communication with the first uncharged channel and a positive
electrode in communication with the second uncharged channel,

wherein a mixture of anions and cations may be separated by drawing the cations toward
10 the negative electrode and drawing the anions towards the positive electrode.
2. The device of claim 1 wherein the first channel comprises a slight charge.
3. The device of claim 1 wherein the first channel comprises a coating.
4. The device of claim 3 wherein the second channel comprises a coating.
5. The device of claim 3 wherein the coating is Triton X 100.
- 15 6. The device of claim 1 wherein a detector is in communication with the first uncharged
channel.
7. The device of claim 1 wherein a first detector is in communication with the first
uncharged channel to detect cations and a second detector is in communication with the
second uncharged channel to detect anions.
- 20 8. The device of claim 1 further comprising a hydrodynamic flow resistor positioned in the
first uncharged channel.
9. The device of claim 1 further comprising a pressure outlet.

10. The device of claim 1 wherein a dual channel detector is in communication with the first uncharged channel and the second uncharged channel.
11. The device of claim 1 wherein the first uncharged channel is a capillary.
12. A microfluidic bi-directional capillary electrophoresis device, comprising:
- 5 a middle column;
- the middle column intersecting a first uncharged channel and a second uncharged channel at an intersection point wherein the middle column is approximately perpendicular to the first uncharged channel and the second uncharged channel; and
- 10 a negative electrode in communication with the first uncharged channel and a positive electrode in communication with the second uncharged channel,
- wherein a mixture of anions and cations may be separated by drawing the cations toward the negative electrode and drawing the anions towards the positive electrode.
13. The device of claim 12 wherein the first uncharged channel is engaged to a first microfluidic system for proteome analysis.
- 15 14. The device of claim 13 wherein the second uncharged channel is engaged to a second microfluidic system for proteome analysis.
15. The device of claim 12 wherein the first channel comprises a slight charge.
16. The device of claim 12 wherein the first uncharged channel comprises a coating.
17. The device of claim 16 wherein the second channel comprises a coating.
- 20 18. The device of claim 16 wherein the coating is Triton X 100.
19. The device of claim 12 wherein a detector is in communication with the first uncharged channel.

20. The device of claim 12 wherein a first detector is in communication with the first uncharged channel to detect cations and a second detector is in communication with the second uncharged channel to detect anions.
- 5 21. The device of claim 12 further comprising a hydrodynamic flow resistor positioned in the first uncharged channel.
22. The device of claim 12 further comprising a pressure outlet.
23. The device of claim 12 wherein a dual channel detector is in communication with the first uncharged channel and the second uncharged channel.
24. A method of separating a sample of anions and cations, comprising:
- 10 delivering the sample to a middle column of a bi-directional capillary electrophoresis device;
- providing a first uncharged channel and a second uncharged channel approximately perpendicular to the middle column wherein the middle column intersects the first uncharged channel and the second uncharged channel at an intersection point;
- 15 positioning a negative electrode in communication with the first uncharged channel thereby drawing cations into the first uncharged channel; and
- positioning a positive electrode in communication with the second uncharged channel thereby drawing anions into the second uncharged channel.
25. The method of claim 24 wherein the first channel comprises a slight charge.
- 20 26. The method of claim 24 wherein the first uncharged channel comprises a coating.
27. The method of claim 26 wherein the second uncharged channel comprises a coating.
28. The method of claim 26 wherein the coating is 100 Triton-X.

29. The method of claim 24 further comprising:
placing a detector in communication with the first uncharged channel to detect cations.
30. The method of claim 29 further comprising:
placing a detector in communication with the second uncharged channel to detect anions.
- 5 31. The method of claim 24 further comprising:
placing a dual channel detector in communication with the first uncharged channel and
the second uncharged channel.
32. The method of claim 24 further comprising:
placing a hydrodynamic flow resistor in communication with the first uncharged channel.
- 10 33. A method of separating a sample of anions and cations on a microfluidic device,
comprising:
delivering the sample to a middle column of a bi-directional capillary electrophoresis
device;
providing a first uncharged channel and a second uncharged channel approximately
15 perpendicular to the middle column wherein the middle column intersects the first
uncharged channel and the second uncharged channel at an intersection point;
positioning a negative electrode in communication with the first uncharged channel
thereby drawing cations into the first uncharged channel; and
positioning a positive electrode in communication with the second uncharged channel
20 thereby drawing anions into the second uncharged channel.
34. The method of claim 33 wherein the first channel comprises a slight charge.

35. The method of claim 33 wherein the first uncharged channel comprises a coating.
36. The method of claim 35 wherein the second uncharged channel comprises a coating.
37. The method of claim 35 wherein the coating is 100 Triton-X.
38. The method of claim 33 further comprising:
- 5 placing a detector in communication with the first uncharged channel to detect cations.
39. The method of claim 38 further comprising:
- placing a detector in communication with the second uncharged channel to detect anions.
40. The method of claim 33 further comprising:
- placing a dual channel detector in communication with the first uncharged channel and
- 10 the second uncharged channel.
41. The method of claim 33 further comprising:
- placing a hydrodynamic flow resistor in communication with the first uncharged channel.
42. The method of claim 33 further comprising:
- engaging the first uncharged channel to a first microfluidic proteome analysis system.
- 15 43. The method of claim 42 further comprising:
- engaging the second uncharged channel to a second microfluidic proteome analysis system.